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CHASEA FLEXILIS (Gatt.) Nwd.

Panicum flexile (Gatt.) Scrib. 1893.

Panicum capillare var. *flexile* Gattinger, 1887.

Other plants belonging to the group are *P. patens* L.; *P. latifolium* Linn., *P. brevifolium* Linn., and many more.]

TERATOLOGICAL NOTES.

IV.—Frequent Occurrence of a Third Pseudocardinal in the Right Valve of Certain Species of *Lampsilis*.

During the past four years, I have examined the hinge areas of a large number of *Unionidæ*, and have been much impressed with the fact that the dentition of these freshwater mollusks is very variable, not only within the family and within the genus, but even within the species. That considerable variation exists is to be expected, since it is generally conceded that the teeth of *Pelecypoda*, being largely moulded by the dynamics of situation, change with the influences to which their form is due, and in the course of time may become obsolete from disuse, as in *Anodonta**, or may simulate those of other groups. As a rule, however, the type of dentition is pretty constant for the various families and genera, so that they may be given a definite dental formula. The freshwater mussels are schizodont in their dentition, their hinge teeth, when present, consisting of a subumbonal and a lateral series, known as pseudocardinals and pseudolaterals. The ligament is external, parivincular and opisthodontic. *Unionidæ* are distributed in the lakes, ponds, and streams throughout the entire world, and in the Mississippian region of America we find their metropolis.

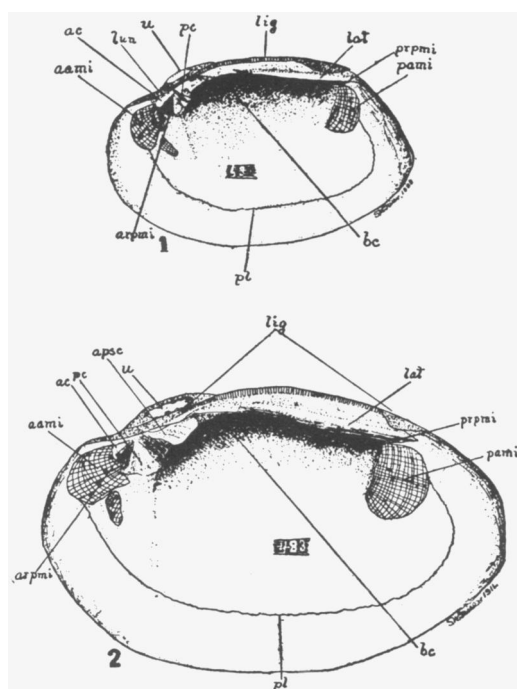
In his Synopsis, the only comprehensive recent work dealing with the great family of Naiades, Simpson† defines the dentition of the genus *Lampsilis* in the following characterization: "Hinge with one or two pseudocardinals and one lateral in the right valve, and two pseudocardinals and two laterals in the left." Other

* Dall, W. H. in von Zittel, Karl A. Textbook of Palaeontology, Eastman's Translation I (2): 353-354. (1900).

† Simpson, Charles Torrey. Synopsis of the Naiades, or Pearly Fresh-Water Mussels. Proc. U. S. Nat. Museum XXII: 526. (1900).

writers on the genus have subsequently given practically the same definition. However, within this genus there are a number of notable departures from the typical generic dentition, as exemplified in the type, *Lampsilis ovata* (Say) Rafinesque, and in the groups of *L. (Proptera) gracilis*, *L. (P.) amphichæna*, and *L. (P.) leptodon*, we find species having the pseudocardinals, laterals, often rudimentary or almost wanting.

In the accompanying figures are shown the normal right valve of *L. ligamentina* (Fig. 1.) and a right valve of the same



species in which there is a strongly developed third pseudocardinal. (Fig. 2). Each valve in this species has normally two pseudocardinals, with two laterals in the left, and one in the right valve. The pseudocardinals on the left valve are nearly equal in size, and are solid, triangular, and marginally crenulate. In the right valve the anterior pseudocardinal is very small (see figure); the posterior is large, triangular, and crenulate. The laterals are strong and direct and are curved post-ventrally, and show on

their edges a transverse striation commonly to be observed in many Uniones.

Most of the *Unionidae* now in the Museum of the Upper Iowa University were collected in the Wapsipinicon River near Independence, Iowa. A considerable number of the specimens, especially those referable to such abundant and widely distributed species as *L. ligamentina*, *L. recta*, and *L. ventricosa*, show to a greater or less extent the development of a third tooth, just behind the normal posterior pseudocardinal (*pc* in figures). A large series of specimens shows the development of this third tooth in a number of species. It varies in size from a simple rounded caruncle on the usually smooth dental bridge, to a tooth as large or even larger than the normal posterior pseudocardinal. At Figure 2 is shown such a specimen, No. 483, U. I. U. Museum. The third tooth (*apsc* in Fig. 2), is very strongly developed. The connecting bridge, instead of being smooth, is raised into a sharp ridge, appearing a little as if it might be a rudimentary second lateral. The normal lateral tooth does not differ in any material respect from those in specimens in which the third pseudocardinal is not developed.

It is impossible at the present time to say whether this abnormality is caused by unfavorable embryonic conditions thus being truly teratologic. I am inclined to think, however, that it is merely a reversion, since it occurs so commonly among the freshwater mussels. True teratism, such as transposition of the teeth, etc., occurs quite rarely, and but little is known at the present time as to the causes of such abnormalities. Its study offers an interesting field for qualified workers.

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EXPLANATIONS OF THE FIGURES.*

Fig. 1. Normal right valve of *Lampsilis ligamentina* (Lam.)

Fig. 2. Right valve of *Lampsilis ligamentina*, showing third cardinal tooth. *aami*, anterior adductor muscle impression; *ac*, anterior pseudocardinal; *apsc*, third pseudocardinal; *arpmi*, anterior retractor pedis muscle impression; *bc*, beak cavity; *lat*, lateral hinge tooth; *lig*, ligament; *lun*, lunule; *pami*, posterior adductor muscle impression; *pc*, normal posterior pseudocardinal; *pl*, pallial line; *prpmi*, posterior retractor pedis muscle impression; *u*, umbo.

* Figures are all $\frac{1}{2}$ natural diameter.